WGATE-PRO-41A1F1

User Manual rev. 1.5

DASH7 915 MHz - IP Gateway for Industrial Applications

FCC ID : 2ARZVWG-41A1F1

Introduction

Features

- Metallic casing for enhanced protection.
- Full D7A-IP Gateway for DASH7 Alliance Protocol v1.2.
- Controlled over HTTPS and MQTT.
- Ethernet connectivity.
- Cellular Connectivity
- 915 MHz ISM band.
- Modulation schemes:
  - FSK @ 9.6 / 55.6 / 166.7 kbps
  - LoRa @ SF8, SF10, SF11, SF12
- Output power up to +13 dBm.
- 12V power supply.
- Operating temperature: 0 °C to 40 °C

Applications

- Wireless sensor network
- Security systems
- Industrial monitor and control
- Internet of things (IoT)

Description

- The WGATE is a fully integrated DASH7 Gateway operating in the 915 MHz ISM bands.
- Based on Variscite DART-6UL chipset with enhanced MQTT firmware.
- D7A modem at 915MHz compatible with D7A 1.2 specification (www.dash7-alliance.org)
- Controlled directly from its online interface.
- Allows for bi-directional communication with any DASH7 enabled device.
- Mikrobus™ extension slot.
- WizziLab product line at www.wizzilab.com/products

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1 Hardware characteristics

1.1 Recommended operating conditions

Table 1. Recommended operating conditions

Symbol	Parameter	Min.	Typ.	Max.	Units
T_A	Operating ambient temperature range	0	-	40	°C
V_{CC}	Operating supply voltage	10.0	12.0	14.0	V
RH	Non-condensing Relative Humidity	Less than 95% at 40°C			%

1.2 Mechanical description

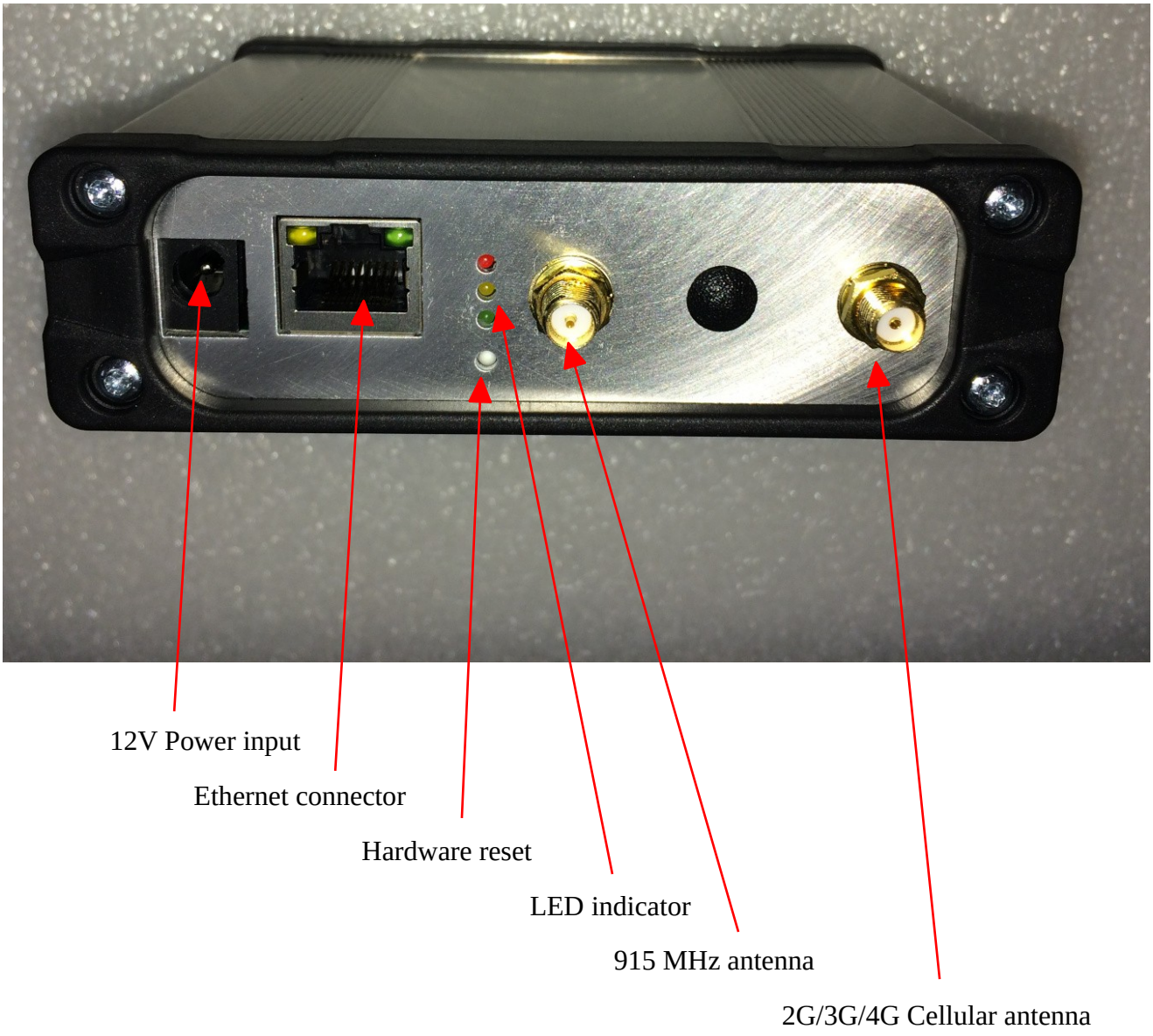


Table 2. Casing dimensions

Parameter	Value	Units
Dimensions, Length x Width x Height	115 x 55 x 42	mm
Weight	300	g

1.3 Power supply

The WizziGatePro works on a 12V external power supply, model YNQX18

Drawing 1: Power Jack polarity

1.3.1 Specifications

Voltage : 100-240Vac

Input Current : 1A

Frequency : 50-60Hz

Efficiency Level : VI

Low Standby Power : 0.3W Max

Output Voltage Tolerance : ±5%

Output Voltage : 12V

Output Current : 1.5A Max

Output Power : 18W Max

1.3.2 Certificates Obtained

CB Report (Global): IEC60950-1/IEC60065/IEC61558-2016/IEC61347

CCC Certificate (China): GB4943-2001/GB8898

GS Certificate(Europe): EN60950-1/EN60065/EN61558/EN61347

CE Certificate(Europe): 2014/30/EU

BS Certificate(Britain): BS EN60950-1/BS EN60065/61558/EN61347

UL Certificate(North America): UL/CUL60950-1/UL1310

SAA Certificate(Australia): AS/NZS 60950.1 AS/NZS 60065

KC Certificate(Korea): K60950-1

PSE Certificate(Japan): J60950-1

1.3.3 Reliability

Burn in: 100% full load, 40±5 °C , 4 hours

Leakage Current: 0.25mA Max. at 240Vac

Voltage Withstand (Between Primary and Secondary): 3000Vac,60S, 5mA Max.

Insulation Resistance (Between Primary and Secondary): 20MΩ min at 500V DC

MTBF: over 30,000 hours @25 °C with full load according to MIL-HDBK-217F.

1.3.4 Protection

Short Circuit Protection: The power supply will recover automatically after fault removed

Over Current Protection: The power supply will recover automatically after fault current removed

Over Voltage Protection: The power supply will be shutdown when output voltage exceeds rated voltage by 150%-180%, and recover automatically after fault removed.

1.3.5 Environmental Specifications

Operating Temperature: 0 °C to 40 °C at maximum load

Storage Temperature: -20 °C to 85 °C

Storage Relative Humidity: 5% to 95% non-condensing

1.3.6 Immunity

Radiation: 61000-3-2

Electrostatic Discharge: 61000-4-2

Electromagnetic Field Radiation : 61000-4-3

Instantaneous Discharging : 61000-4-4

Surge : 61000-4-5

Conducted Interference : 61000-4-6

Voltage Interruption and Variation : 61000-4-11

1.3.7 EMC Compliance

North American Market FCC: FCC Part 15 Class B

European Market EMC: EN55013/55022 Class B

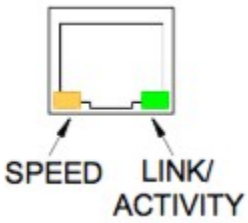
Chinese Market: GB9254-2008/GB17625.1-2003/GB13837-2003/GB17625.1-2003

Australian Market C-TICK: CISPR13/22 Class B

1.4 10/100/1000 Ethernet

The GW supports one GbE port. The Ethernet port operates in a 10BASE-T, 100BASE-TX or 1000BASE-T configuration and supports auto MDI/MDIX for automatically switching data receive and data transmit pairs. Additional features include full-duplex operation as well as support for auto-negotiation. The Ethernet MAC address is programmed during manufacturing.

The Ethernet port is available through a standard RJ45 connector with integrated status lights. The green status light indicates link and activity. The green light is on for link and blinking for activity. The yellow status light indicates speed. The yellow light is off for 10Mbps, on for 100Mbps, and blinking for 1000Mbps.



Drawing 2: Ethernet RJ45 Connector

1.5 LED indicator

These LEDs display the status of the WizziGatePro.

RED LED: Power Supply Status

- ON: Powered by Adapter
- GLOWING: Charging Internal Battery (Internal Battery is an optional feature)
- BLINKING every 1s: Battery Powered
- BLINKING every 5s: Battery Powered in Sleep Mode

ORANGE LED: Network Error Status

- ON: Can not ping Dash7Board (i.e. Internet available)
- BLINKING: Cellular connected but can not ping Dash7Board (with cellular option)

GREEN LED: OK Status

- ON: Gateway running OK
- OFF: Gateway detects an issue

1.6 Main SubGHz modem

A reverse polarity SMA connector is provided for connecting an externally mounted antenna (915MHz FCC).

1.7 Reset button

Using a paperclip, you can press the button through the little hole

Press button for 2s to reset the board.

Press the button for 6s to go to or exit SLEEP mode

1.8 Chipset

The WizziGatePro uses Variscite's DART-6UL SoM (System on Module) and WizziLab's custom carrier board.

The DART-6UL features:

- 900 MHz ARM Cortex-A7
- 128 MB DDR3L memory
- 128 MB NAND memory

WizziLab's carrier board has:

- Ethernet port
- DASH7 sub-GHz modem
- Mikrobus™ port (for optional DASH7 sub-GHz modem)
- Mini PCI Express connector (for optional 4G communication module)
- MicroSIM slot

1.9 Cellular connectivity (4G)

The gateway can be equipped with a SIM7600G-H-PCIE module (**FCCID 2AJYU-8PYA003**) in the internal Mini PCI Express connector. A SMA connector is provided for connecting an externally mounted cellular antenna. The gateway has a SIM slot in MicroSIM format. The SIM card is not provided.

Cellular connectivity is available only on WGATE-PRO-41A**1**FA part number (FCCID 2ARZVWG-41A1F1).

2 Electrical characteristics

2.1 Current consumption

Table 3. Current consumption @ 12V

Symbol	Parameter	Min.	Typ.	Max.	Units
I_S	Sleep mode	-	0.1	-	mA
I_A	With Cellular option	-	-	1500	mA

3 Wireless characteristics

3.1 Certifications

The DASH7 modem has been approved for usage under FCC (FCCID: 2ARZVWM)

3.1.1 DASH7 modem

3.1.2 Data Rates

The DASH7 modem has several data rates and modulation scheme available to better fit any kind of application.

Table 4. DASH7 data rates

Modulation scheme	Parameter	Rate	Data Rate	Units
GFSK	ECC and FCC	High	166700	bps
	ECC and FCC	Normal	55600	bps
	ECC and FCC	Low	9600	bps
LoRa™	ECC and FCC	SF8	3125	bps
	ECC and FCC	SF10	980	bps
	ECC only	SF11	440	bps
	ECC only	SF12	250	bps

3.1.3 Transmitting power

Table 5. DASH7 Transmission power

Area	Max TX power	Units
GFSK	+13	dBm
LoRa™	+13	dBm

3.1.4 Receiver sensitivity

Table 6. DASH7 Reception sensitivity

Modulation scheme	Rate	Typical Sensitivity	Units
GFSK	High	-105.0	dBm
	Normal	-110.0	dBm
	Low	-117.5	dBm
LoRa™	SF8	-125.5	dBm
	SF10	-131.0	dBm
	SF11	-133.5	dBm
	SF12	-135.5	dBm

4 How to use

To setup your wizzigate pro, you will need to:

- Power up your wizzigate.
- Access its administration interface.
- Register the gateway to the Wizzilab cloud.
- Configure its network configuration according to your production environment.

4.1 Powering the WGATE-PRO

The WizziGate is powered by a 12V power supply provided with the AC adapter shipped with the gateway.

4.2 Connect to the Wizzigate administration interface

4.2.1 Connect the gateway to a network with a DHCP server

For your first gateway setup, you need a local ethernet network with a DHCP server and an available ethernet port on a network switch/router of that network (or a computer that can supply a DHCP server).

Plug the ethernet port of the Gateway to your local network via an ethernet cable.

The Gateway is configured as a DHCP client so if you have a DHCP server it will automatically join the network.

The Gateway broadcasts its name using avahi so it can be reached at http://wizzigate.local. If you change the hostname of the gateway, the address will become http://hostname.local. If there are multiple gateways with the same hostname on the network, they will be named "hostname.local", "hostname-2.local", ...

To configure the Wizzigate, you need to have access to its administration web interface (via a standard browser).

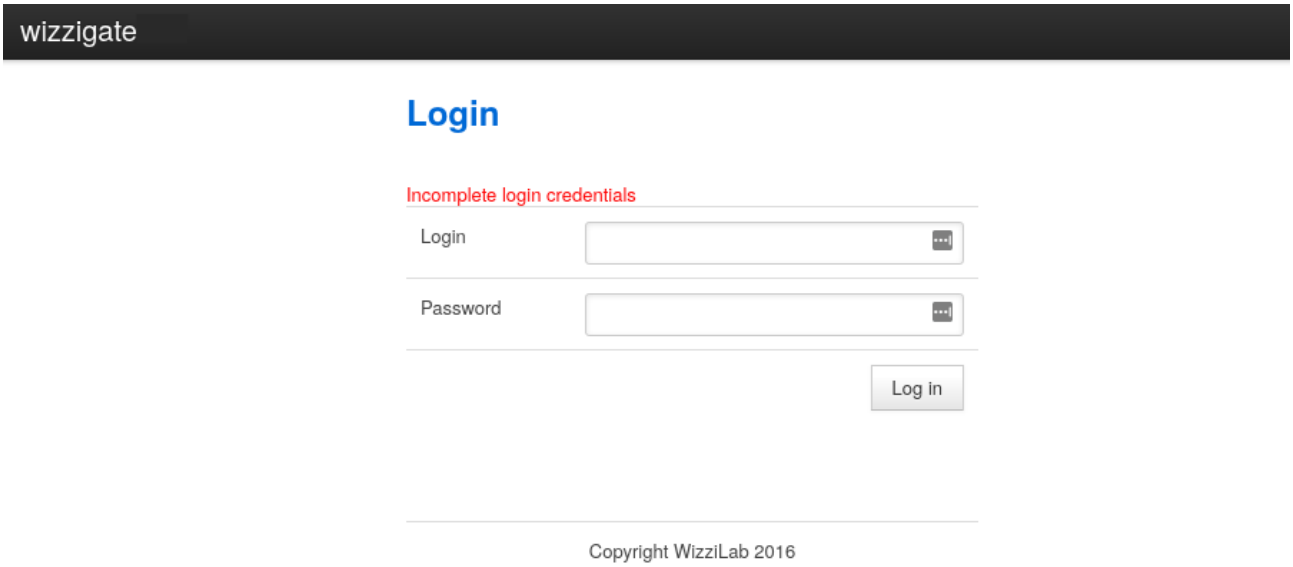
4.2.2 Login into to web interface

The default credentials for the Gateway Administration web interface are:

- user: user

- password: user

You can later change the default credentials.

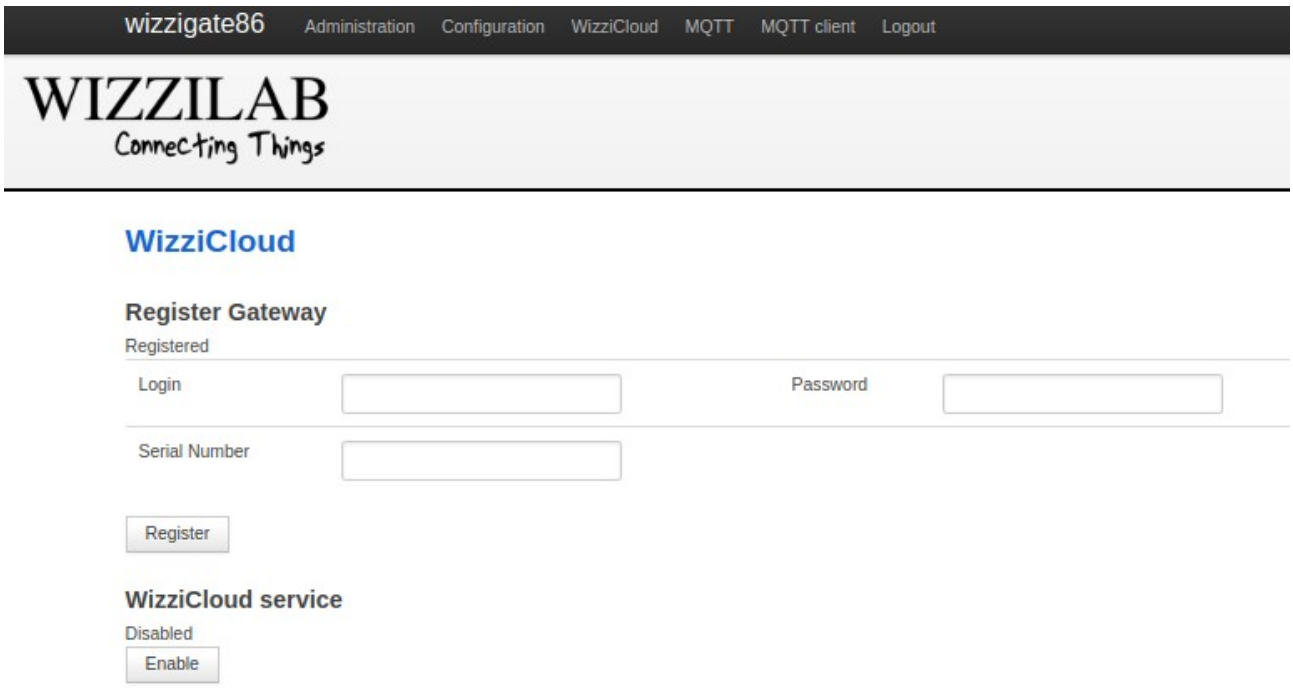


4.3 Register the gateway to the Dash7Board

NOTE: Registering to the Dash7Board requires an account on the Dash7Board. If you don't have an account on the Dash7Board, your Gateway has been pre-registered and you can skip this step.

Once you have access to the administration web interface of the gateway, you have to register the gateway to the dash7board server.

On the gateway administration web interface, go to the "Wizzicloud" tab:



Fill the username and password fields with your dash7board credentials. Fill the serial number field

with the serial number (**SN**) your gateway's label.

Click the Register button.

4.4 Configure the network

In most standard setup, the gateway needs to be connected to a network. It allows it to be accessible by applications on this network and to connect to our dash7board.wizzilab.com cloud backend (if internet is accessible) and/or to a local backend.

If using the Wizzilab dash7board cloud solution, the gateway requires its internet access to allow some outgoing ports.

The gateway can be connected to internet either via ethernet or via cellular.

4.4.1 Required outgoing network ports

443/tcp (https) to dash7board.wizzilab.com. Beware, this domain name points to a range of IP addresses (cloud based server).

8883/tcp (mqtts) to roger.wizzilab.com

1194/udp (openvpn) to wizzivpn2.wizzilab.com

123/udp (ntp) to roger.wizzilab.com

53/(udp+tcp) (dns) 8.8.8.8. This is only required if the gateways' ethernet configuration is static. If the gateways are using DHCP, they will use the network's DNS configuration.

4.4.2 Ethernet

WARNING: You will be configuring the gateway via its ethernet connection. Therefore, if you change anything to the ethernet configuration, you will likely cut yourself off the gateway (as the configuration will probably not be viable anymore for the network it is connected on). Therefore, make sure the ethernet configuration you enter is correct before clicking on the Apply button.

Using DHCP

If the network you are connecting the gateway to has a DHCP server (it is generally the case), this is

the type of setup you want.

If you have never touch the Wizzigate ethernet configuration on its web interface configuration tab, then it is configured by default to use DHCP. Therefore you can just plug the gateway to the network, and it should automatically get access to it. If you changed the Wizzigate ethernet configuration:

- Go to the configuration tab of the administration web interface.
- In the Ethernet section, tick the DHCP checkbox.

Using a static IP configuration

If you don't have DHCP server on your network, then you will need to configure the gateway with a fixed IP configuration. To do that:

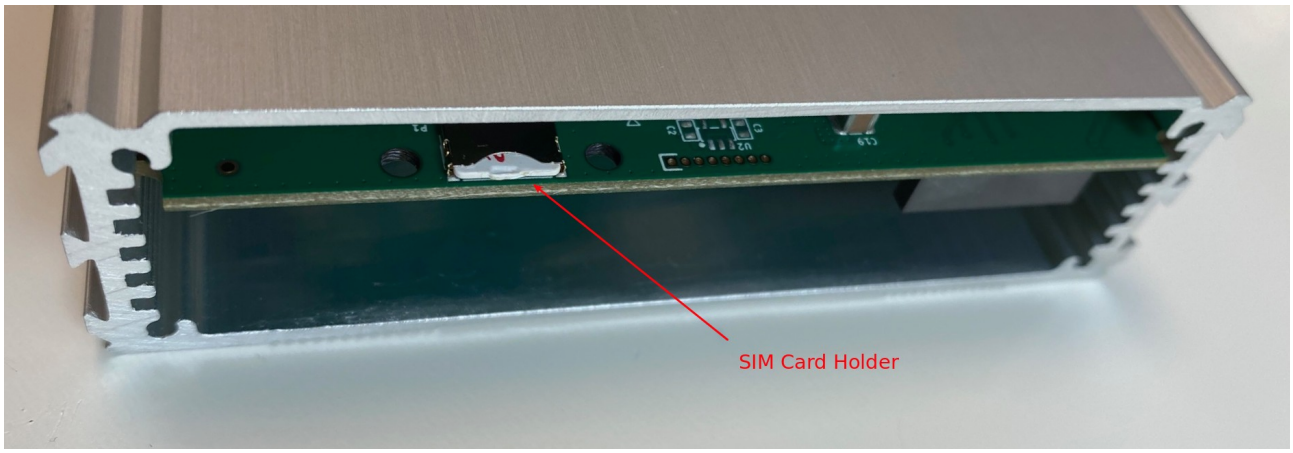
- Go to the configuration tab of the administration web interface.
- In the Ethernet section, untick the DHCP checkbox.
- In the Ethernet section, Fill the network configuration settings.
- Press the Apply button in the Ethernet section.

4.5 Cellular

WARNING: The current wizzigate software does not support the use of a PIN code, even though the field exist in the configuration. Setting the PIN code might work the first time you try, but will not persist through a gateway reboot. Therefore only use the wizzigate with a SIM card for which the PIN code is disabled.

4.5.1 Insert your SIM card in the gateway

- Unscrew the back of the gateway.
- Insert your SIM card in the SIM card slot of the gateway.
- Close the gateway.

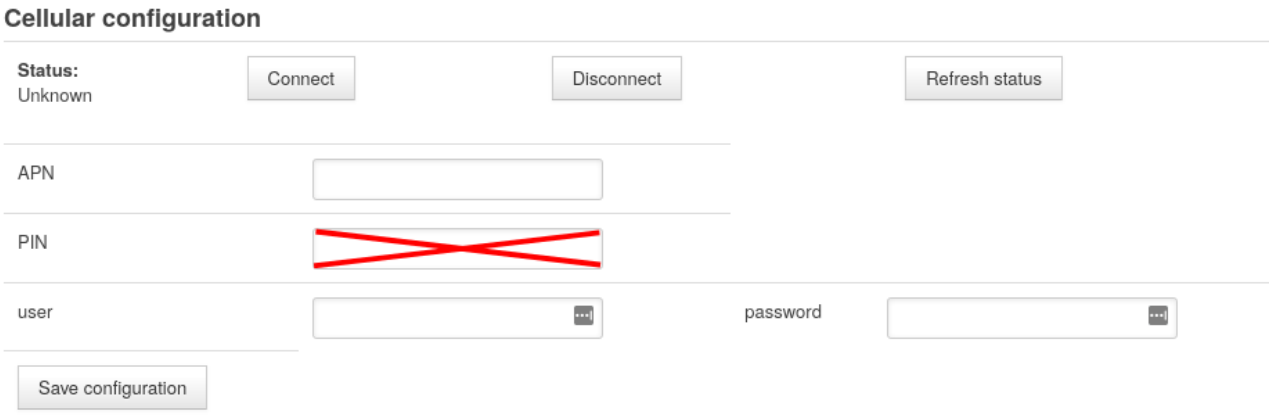


4.5.2 Configure the cellular module

Go to the configuration tab of the administration web interface.

- In the Cellular section, fill in the cellular informations.
- Press the Save configuration button in the Cellular section to save the configuration.
- Press the Connect button in the Cellular section to enable the cellular connection.

Upon pressing the apply button, the Cellular status should switch to on. Then, if the configuration



is correct and the signal strength of the cellular network is sufficient, the status should turn to on | connected | -51 dBm ....

4.6 Online Installation Guide

Keep up to date with to the latest installation tips on our Quick Start Guide.

5 Ordering information

Contact us at : contact@wizzilab.com

Or visit our website: http://www.wizzilab.com/

6 FCC Caution

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT NOTE:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

7 Revision history

Table 7. Document revision history

Date	Revision	Changes
2019-05-16	1.0	Document creation
2019-10-04	1.1	Updated picture with grey casing Added information on LED and Button
2020-11-10	1.2	User Manual for FCC certified version
2020-12-14	1.3	Added FCCID of the 4G modem
2020-12-22	1.4	Update pictures. Detailed How To Use section.
2020-12-23	1.5	Fix typos